

*MEIOPRIAPULUS FIJIENSIS* MORSE (PRIAPULIDA)  
FROM SOUTH ANDAMAN, ANOTHER EXAMPLE OF  
LARGE-SCALE GEOGRAPHIC DISTRIBUTION OF  
INTERSTITIAL MARINE MEIOFAUNA TAXA

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*Abstract.*—The interstitial priapulid *Meiopriapulus fijiensis* Morse, 1981, is described for the first time outside of its type locality on Fiji from a coral reef on the Andaman Islands. The species identification is based on SEM investigations of cuticular structures.

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Priapulids are among the more recent discoveries in the marine meiofauna. Remane (1963) saw the first interstitial representative of this taxon during his investigations in the Red Sea. Van der Land (1968) gave the first description of a meiobenthic priapulid, *Tubiluchus corallicola*, which he found in shallow coral sand from Curaçao. Since that time, four additional *Tubiluchus* species have been described and two genera erected. *Maccabeus* Por, 1973, with at least one species is obviously identical with Salvini-Plawen's (1974) *Chaetostephanus* (Calloway 1988). *Meiopriapulus* Morse, 1981, the most recently discovered genus, is represented by the species *fijiensis* known from a single beach on Viti Levu, Fiji. Details of its integument and anatomy were published by Storch et al. (1989a, 1989b). Nevertheless, priapulids are extremely rare representatives of the interstitial meiofauna. Present records (reviewed by Calloway 1988) appear to indicate their endemic distribution in more or less insular habitats, except for *Tubiluchus corallicola* which is recorded from Curaçao, the Carribean Sea, Bonaire, Barbados and Bermuda (Van der Land 1970). All the more surprising and of zoogeographic interest was the discovery of the Pacific *M. fijiensis* in the Andaman Sea during a short collecting trip by the author to the Andaman Islands in February 1988.

*Meiopriapulus fijiensis* Morse, 1981

Methods and Materials

Extraction took place in a room of the Hotel Aasiana, Port Blair. The sediment was mixed with a solution of about 8% MgCl<sub>2</sub> in tap water to relax any meiofauna present, and sieved through a 63 μm screen. The fraction was placed in fresh sea water and the animals were observed and sorted live using a transportable dissecting microscope. Oocytes were observed in at least two of the specimens. Following narcotization with the MgCl<sub>2</sub>-solution, the specimens were fixed for several weeks in either 10% formalin or in Bouin's fluid and then transferred into 70% ethanol. The fixed animals exhibited all stages of contraction, inversion, and evertion of the introvert. Four specimens were postfixed with 1% OsO<sub>4</sub> in aqua dest., critical point dried in CO<sub>2</sub>, coated with gold and examined with a Cambridge Stereo Scan 250. One specimen was whole-mounted in W 15 mounting medium and examined using interference contrast microscopy.

Results

*Material.*—Twelve specimens of different size were found. Five of them were used for identification, two were deposited in the National Museum of Natural History,

Smithsonian Institution, Washington, D.C.: USNM 128299, and five remain in the collection of the author.

*Locality.*—Bay of Bengal, Andaman Islands, South Andaman. Coral reef in front of a small village about 10 km south of Port Blair. In water covered patches of clean coral sand between coral clumps in the surf zone of the reef edge; during low tide, 19 Jan 1988.

*Measurements.*—Length between 1.2 and 1.7 mm; width of the abdomen about 300  $\mu\text{m}$ .

*External morphology.*—The terminology used is based on the species description of Morse (1981) and also incorporates the findings of Storch et al. (1989a, 1989b). Only cuticular details are described. The overall external morphology totally agrees with the description of Morse (1981): a cylindrical body consisting of a bulbous anterior introvert and an elongate abdomen, the posterior end of which is conical in shape and bears a circle of protruding hooks (Fig. 1A).

The introvert sensory scalids are arranged in three circlets. The eight unornamented elongate scalids of the anterior circlet (length about 70  $\mu\text{m}$ ) consist of a basal half with two scale-like cover elements (Fig. 2B) and tubular protrusions at the tip. The upper cover element is triangular (t), and the lower one is comb-like with fine fimbriations (c). Fimbriae in groups or singly may occur proximally to the lower cover element (s). Two small flosculi with circularly arranged papillae (“petals”) (f) occur at the base of the scalids. The second and third circlets of alternately-positioned ornamented scalids each consist of eight elongate structures (length about 50  $\mu\text{m}$ ) bearing overlapping fimbriated cover elements (Fig. 2A). There are usually fewer cover elements in the posterior third circlet (three or four elements) than in the anterior second circlet (four to six). Each scalid bears three distal tubular protrusions; the middle protrusion is longer than the two lateral ones.

The small introvert locomotory scalids of “semi-palm-tree-like shape” are arranged in rows oblique to the longitudinal body axis. Thirteen to 15 scalids occur in each row. The spoon-shaped scalid hood has about 40 fimbriations (Figs. 1E, 2A).

The pharynx is everted in the form of a buccal cone and bears 16 longitudinal rows of fringed teeth with eight (nine?) teeth in each row (Fig. 1A–D). Teeth of adjacent rows alternate, so that 16 (18?) alternating rings of teeth surround the buccal cone. Three different types of teeth are present. The anterior teeth surround the pharynx opening with comb-like arranged fimbriae of nearly equal length (a); the teeth in the following two rings are scale-like with triangularly arranged fimbriations (m), and have a covering row of small fimbriae of equal length on the upper side and fine fimbriations on the inner side. The teeth at the base of the everted pharynx are tripartite, with a central comb-like structure and two lateral bundles of long fimbriae (b) that extend beyond the central comb.

The cuticle of the abdomen is regularly structured with small spherical protrusions, wrinkled by an irregular pattern of folds due to fixation (Fig. 1A) and characteristic tubercles (less than 1  $\mu\text{m}$  diameter) that appear to be equidistant from each other. Behind the introvert the anterior portion of the abdomen possesses triangular scalids that have fimbriated apical edges and a base width of about 20  $\mu\text{m}$ . The posterior end of the abdomen bears a ring of robust hooks each consisting of two strong prongs and a central tubular projection that Storch et al. (1989b) found to be a sensillum. There are numerous flosculi on the abdomen, which increase in number posterior to the ring of hooks. Often, one or two flosculi are associated with a larger cone-shaped structure with a prominent apical tubular projection and a subdistal ring of short petals (“modified tubulus” in Morse (1981); “setae” in Storch et al. (1989b)). The flosculi have a

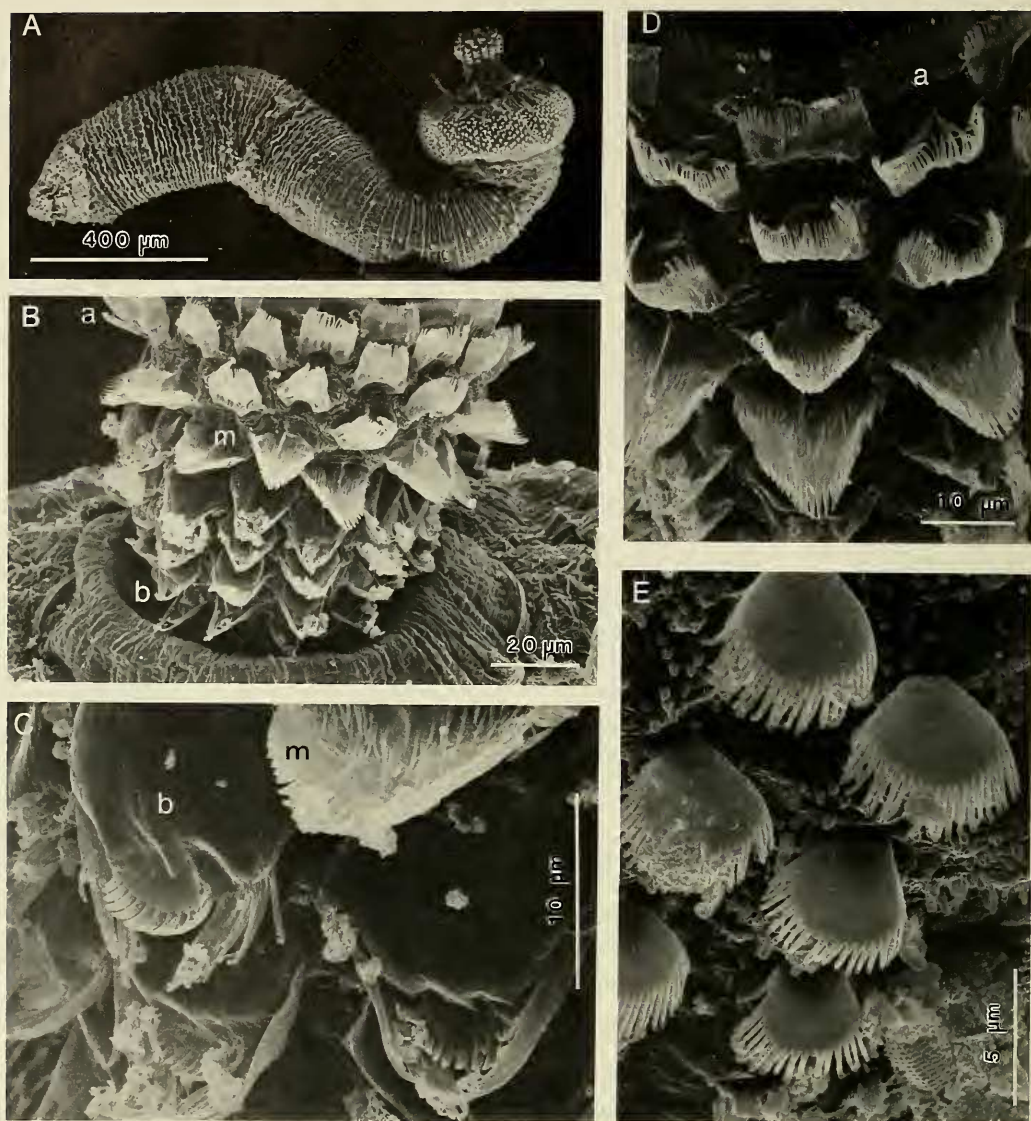


Fig. 1. *Meiopriapulus fijiensis*: A, Whole specimen with pharynx and introvert everted; B, Everted pharynx cone with anterior comb-like teeth (a), middle triangular teeth (m), and basal tripartite teeth (b); C, Close up of middle triangular pharyngeal teeth (m) and basal tripartite teeth (b); D, Close up of anterior comb-like pharyngeal teeth (a) and middle triangular teeth (b); E, Locomotory scalids of introvert.

palisade-like ring of about 14 longer petals, and several smaller inner projections surrounding a central opening.

#### Discussion

The agreement between the Andaman animals and those from the type-locality (Fiji)

(Morse 1981) is extremely high. A few differences, however, exist. The so-called unornamented first circlet scalids of the introvert possess two fimbriate ornamentations, whereas Morse states that they "generally are without ornamentations." Careful examination of additional SEM micrographs of Fijian specimens kindly provided



Fig. 2. *Meiopriapulus fijiensis*: A, Locomotory scalds of introvert and sensory "ornamented" scalds of second and third cirrlet; B, Sensory "unornamented" scald of first cirrlet with two flosculi at the base (*f*). *t* = triangular cover element, *c* = comb-like cover element, *s* = small group of fimbriations.

by Dr. Morse shows them to be present there as well, although being more delicate. The number of scale-like cover-elements on ornamented scalds of the second cirrlet is probably higher (8) than in the Fiji specimens and may be related to age and to moulting (pers. comm. of Morse). Moulting has also been assumed by Storch et al. (1989b).

Storch et al. (1989a) also counted 16 rows of pharyngeal teeth but mention only seven teeth in each row, whereas the Andaman specimens have eight (nine?) teeth per row. The three types of pharyngeal teeth are not described by Morse (1981), but do exist in the Fijian animals (see fig. 5 in Storch et al. 1989a, and fig. 2 in Storch et al. 1989b). Slight quantitative differences also seem to exist in the number of fimbriae of the locomotory scalds, the triangular abdominal scalds and in the number of petals of trunk flosculi, but this may well be due to general variability of these details or because mi-

crographs are unfavorable. The generally less delicate appearance of the fimbriae in the Andaman species may be the result of inadequate fixation.

The absence of distinct differences within the structure-rich details of the body surface suggests that the Andaman and Fiji populations are conspecific. *Meiopriapulus fijiensis* joins the series of intertidal sand inhabiting meiofauna species that appear to exhibit an extremely wide geographic range (Sterrer 1973, Westheide 1977, Ax & Armonies 1987). However, little is known about the taxonomic significance of the external cuticular characters within the Priapulida. Van der Land (1982:333) could find "not a single useful differential character in the adult" between *Tubiluchus corallicola* (from the Caribbean Sea) and *T. remanei* (from the Red Sea) unless he examined the peculiar cuticular organs associated with the male genital pores. No such organs appear to exist for comparison of the two *Meio-*

*priapulus* populations. Further investigations (e.g., by TEM) may elucidate features which may otherwise differentiate between these externally nearly identical members of two widely separated populations, as in the case of the *Microphthalmus listensis* species-complex found on both sides of the Atlantic (Westheide & Rieger 1987).

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